

Lithography-based Ceramic Manufacturing (LCM)

With LCM a photopolymer based ceramic slurry is cured with visible LED light to layer by layer build up ceramic parts. Printed parts are cleaned from uncured slurry residues and then heat-treated to remove the polymeric substances followed by sintering at selected temperatures and atmospheres to produce a fully dense material.



Assembled gas sensor made of Alumina, shaped in two separate parts with excellent fit.

Build volume (X, Y, Z) mm: 76×43×150

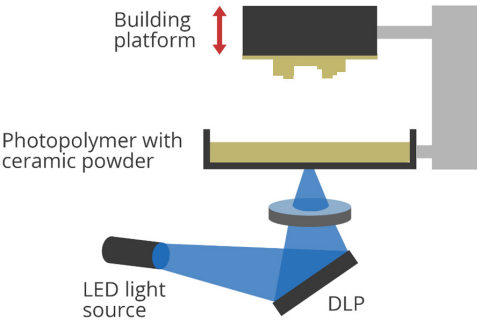
Build speed, slices/hour: Up to 100

Slice thickness, μm : 20-100

Light source: 465 nm LED

Lateral resolution, μm : 40

Materials: Commercially available ceramic slurries are based on high-purity alumina (Al_2O_3), yttria stabilized zirconia (ZrO_2) and a bioresorbable ceramic, tricalcium-phosphate.



Advantages

It is possible to obtain fully dense bodies having flexural strength comparable with conventional production methods and having surface roughness R_a , in the order of $\sim 0.5 \mu\text{m}$.

Challenges

Shrinkage during sintering, typically in the order of 20 %, must be considered in designing the part. It is necessary to adapt a careful binder removal process for components with thick walls. Otherwise, there is a risk of crack formation during the debinding process.